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Social Marketing Campaign at Farmers' Markets to Encourage Fruit and Vegetable Purchases in Rural Counties with a High Obesity Prevalence

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SOCIAL MARKETING CAMPAIGN AT FARMERS' MARKETS TO
ENCOURAGE FRUIT AND VEGETABLE PURCHASES IN
RURAL COUNTIES WITH A HIGH OBESITY PREVALENCE

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in
the College of Agriculture, Food and Environment
at the University of Kentucky

By

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ABSTRACT OF THESIS

SOCIAL MARKETING CAMPAIGN AT FARMERS' MARKETS TO ENCOURAGE FRUIT AND VEGETABLE PURCHASES IN RURAL COUNTIES WITH A HIGH OBESITY PREVALENCE

Farmers' markets are one food environment venue with the potential to increase fruit and vegetable consumption among rural residents in the United States. This study used the Plate It Up Kentucky Proud social marketing campaign in six rural communities over two years to determine the association between exposure to the campaign and fruit and vegetable purchasing decisions. The availability of recipe cards at the farmers' market was associated with influencing the purchase of fruits and vegetables ($p < 0.001$); the recipe sample was associated with buying the ingredients for the recipe ($p < 0.001$); taking the PIUKP food sample was associated with a willingness to prepare the food item at home ($p < 0.001$). Utilizing social marketing strategies at farmers' markets may be an effective way to improve fruit and vegetable intakes in rural communities.

KEYWORDS: Social Marketing, Fruit and Vegetables, Diet Quality, Rural Health, Obesity

Emily Mary Alice DeWitt

October '53, 2017

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Chapter One: Introduction

Background

A diet rich in fruits and vegetables provides many health benefits and has been associated with disease prevention and management. Greater intakes of fruits and vegetables have been associated with lower risks of several chronic diseases such as type 2 diabetes, cardiovascular disease, and cancer. (Ford et al. 2002, Hartley et al. 2012, Turati et al. 2015). Many chronic diseases are associated with higher healthcare costs (Centers for Disease Control and Prevention (CDC), 2016) and a decreased quality of life (Barile et al. 2013). These diseases can be managed with dietary changes; however, while the health benefits of fruits and vegetables are recognized, consumption of these foods remains low among adults in the United States (U.S.). Approximately 85% of the population is consuming fewer than the recommended servings of vegetables and approximately 75% of the population is consuming fewer than the recommended servings of fruits (Dietary Guidelines for Americans, 2015-2020). One approach to improve intake is through a social marketing strategy and improvement in access to healthy foods.

Having access to healthy foods, including fruits and vegetables, has been associated with healthier dietary choices (Bodor et al. 2010, Moore et al. 2008). One potential venue that provides access to fresh, local fruits and vegetables are farmers' markets. Research has found a link between shopping at farmers' markets and the increased consumption of fruits and vegetables (Pitts et al. 2014, Pitts et al. 2015). Farmers' markets often offer a wide variety of fresh, local produce at a reasonable cost. While providing consumers with healthier food options is a major benefit of farmers' markets, they may also be a resource for community growth, both socially and

economically (Sitaker et al. 2014), making them appealing for a variety of reasons. Farmers' markets may be one solution for increasing the purchases of fruits and vegetables in many community settings.

One way to encourage the purchase of fruits and vegetables is the use of marketing strategies, specifically social marketing. Social marketing is one approach to reach audiences at farmers' markets by promoting increased consumption of fresh fruits and vegetables. Social marketing strategies have successfully been used in several settings with many populations for a variety of healthy eating goals, including fruit and vegetable consumption (Gordon et al. 2006, Blitstein et al. 2012, Freedman et al. 2011). By utilizing social marketing campaigns, and encouraging those at farmers' markets to purchase fruits and vegetables, more healthful dietary patterns and an improved quality of life are expected.

Problem Statement

Studies have been conducted to examine the relationship between farmers' markets and fruit and vegetable purchases and consumption, as well as the relationship between social marketing campaigns and fruit and vegetable consumption. Limited research exists examining the relationship between the use of social marketing campaigns at farmers' markets as a tool to increase the purchase of fruits and vegetables. The present study attempts to fill this gap.

Statement of Purpose

The purpose of this study was to assess the influence of a social marketing campaign on fruit and vegetable purchasing habits at farmers' markets across rural counties in Kentucky with obesity rates greater than 40%.

Research Question

1. How does a fruit and vegetable social marketing campaign influence rural farmers' market patrons' purchasing decisions?

Hypothesis

1. A fruit and vegetable social marketing campaign will increase rural farmers' market patrons' willingness to purchase fruits and vegetables.

Research Aims

To achieve the purpose of this study the aims are to:

1. Determine the association between exposure to a social marketing campaign and fruit and vegetable purchases at farmers' markets.
2. Determine the association between recipe sampling and fruit and vegetable purchases at farmers' markets.

Justification

Chronic diseases may lead to higher healthcare costs (CDC, 2016), as well as a decreased quality of life (Barile et al. 2013); however, greater intakes of fruits and vegetables are associated with lower risks of several chronic diseases (Ford et al. 2002, Hartley et al. 2012, Turati et al. 2015). While the health benefits are known,

approximately three-fourths of the U.S. adult population is consuming less than the recommended amounts of both fruits and vegetables (Dietary Guidelines for Americans, 2015-2020). Farmers' markets have been shown to play an influential role in the consumption of fruits and vegetables (Pitts et al. 2014, Pitts et al. 2015) and they may be a potential outlet for increasing the purchase of fruits and vegetables. Social marketing strategies may also prove to be useful in encouraging farmers' market patrons to purchase fresh fruits and vegetables. Working to increase access to and the purchase of these items are key strategies to increase consumption. The results of the present study may provide useful insight into how the farmers' market fruit and vegetable purchasing decisions of rural U.S. residents are influenced by a social marketing campaign.

Chapter Two: Literature Review

Introduction

Research has shown that a diet rich in fruits and vegetables offers many health benefits. Greater intakes of fruits and vegetables have been associated with lower risks of chronic diseases such as type 2 diabetes (Ford et al. 2002), cardiovascular disease (Hartley et al. (2012), cancer (Turati et al. 2015), and are also associated with decreased all-cause mortality (Oyebode et al. 2014). While these benefits are recognized, consumption of fruits and vegetables remains low in the United States (U.S.) and rural residents consume fewer fruits and vegetables than their urban counterparts (Dean and Sharkey, 2011). Several studies have found that having greater access to healthy foods is associated with healthier dietary choices (Bodor et al. 2010, Moore et al. 2008). Although a diet rich in fruits and vegetables has proven to be beneficial to health, access to these foods can be difficult for many communities (Lutfiyya et al. 2012). Fruits and vegetables are an integral part of an overall healthy diet, and access to these foods is important. Research has found an association between shopping at farmers' markets and the increased consumption of fruits and vegetables (Pitts et al. 2014, Pitts et al. 2015). Farmers' markets are one venue that may be utilized to potentially improve intakes of fruits and vegetables in low-income neighborhoods, rural areas, and food deserts (McGuirt et al. 2014, Lutfiyya et al. 2009, Dietary Guidelines for Americans, 2015). As well, marketing, specifically social marketing, may be a potential tool to reach all audiences in these venues.

The Socioecological Model

There are many factors that have an influence on what people eat. The socioecological model (SEM) is a conceptual framework that depicts these influences and their effect on behavior. There are five spheres of influence, including individual, interpersonal, organizational, community, and policy levels. (CDC, 2015). The SEM reveals how individual choices are impacted by greater influences, such as family, environment, and community.



Figure 2.1 The Socioecological Model (adapted from the CDC, 2015)

When considering food choice, purchasing habits, and eating patterns related to fruits and vegetables, the individual level is predominately focused on a person's perceptions, values, and beliefs about the foods, their skills to select and prepare the

foods, and their demographic characteristics, such as income. All of these factors impact an individual's choice to select and consume fruits and vegetables as part of a healthy diet pattern. The interpersonal level examines how close relationships, between an individual and their family, friends, and peers, impacts their choices. The interactions at this level may impact food choices by mechanisms such as role modeling and social support (Story et al. 2008). The organizational level of the SEM includes the environment where people eat or procure food, including an individual's home or workplace, restaurants, farmers' markets, and supermarkets. Availability and accessibility to selecting fruits and vegetables would be considered at this level, and both have been identified as possible reasons for low fruit and vegetable consumption among rural residents (Lutfiyya et al. 2012). Research suggests having increased access to healthy foods, such as fruits and vegetables, is associated with healthier dietary choices (Bodor et al. 2010, Moore et al. 2008). The community level of influence can be described as a larger construct comprised of the three smaller levels, as this level is comprised on many individuals invested in interpersonal relationships within various environments (CDC, 2013). The final level of the SEM, policy, includes practices, regulations, and policy actions that may be at the state and federal levels to regulate or support health behaviors. In relation to food purchasing decisions, this may be influenced by the availability of Supplemental Nutrition Assistance Program (SNAP) benefits, food safety monitoring, food production and distribution, and food marketing strategies. Interventions can be implemented at every level of the SEM and can be used to examine many areas of the food system. These levels of influence all interact, directly and indirectly, to influence what people eat.

Fruit and Vegetable Intake

Americans are falling short when it comes to consuming the recommended amounts of fruits and vegetables with approximately 85% of the population consuming less than recommended amounts of vegetables and approximately 75% of the population consuming less than the recommended amounts of fruits (Dietary Guidelines for Americans, 2015). The 2015-2020 Dietary Guidelines for Americans recommends consuming a wide variety of vegetables from all subgroups, including dark greens, reds, oranges, and others, as well as regularly consuming fruits, especially whole fruits, as a way to help improve daily intakes.

A study conducted by Grimm and colleagues aimed to examine the disparities in adult fruit and vegetable consumption by percent poverty income ratio, both nationally and within states and territories (Grimm et al. 2012). The researchers hypothesized that adults living with lower poverty income ratios would report a lower consumption of fruits and vegetables (Grimm et al. 2012). They found those living with the greatest poverty were less likely to report consuming fruits twice per day and the percentage of those who reported consuming vegetables three times per day or more was found to be significantly low for all poverty income ratio groups (Grimm et al. 2012). Although poverty has been shown to be tightly associated with lower intake of fruits and vegetables, there are also differences between rural and urban areas.

The disparities between rural and urban food environments are becoming an area of increased interest for researchers. In a study aiming to determine the extent of inadequacy of home and community food resources, Dean and Sharkey (2011) examined both the rural and urban food environments. The researchers wanted to identify the

varying sociodemographic, household, and community characteristics that influence fruit and vegetable intake (Dean and Sharkey, 2011). Total fruit and vegetable intake was found to be significantly different between rural and urban samples, with urban respondents reporting greater intakes than their rural counterparts (Dean and Sharkey, 2011). Those from rural areas reported inadequate household food resources and also reported traveling a greater distance to purchase their groceries (Dean and Sharkey, 2011). The findings of this study support the need for examining the food environment as a whole as a way to mitigate differences between urban and rural food access, especially related to distance traveled to procure food, in order to improve fruit and vegetable intakes.

Lutfiyya (2012) and colleagues also wanted to identify the differences in geographical fruit and vegetable intakes and did so by examining the differences in consumption of at least five daily combined servings of fruits and vegetables between rural adults and non-rural adults in the United States. Findings indicated that rural adults were less likely to consume five or more servings of fruits and vegetables than those living in non-rural areas (Lutfiyya et al. 2012). The researchers examined underlying reasons for these results and concluded that availability and accessibility may be issues for low fruit and vegetable intake among rural residents (Lutfiyya et al. 2012).

Access to Fruits and Vegetables

Having access to fruits and vegetables is key to greater consumption in the diet. A study conducted by Caldwell (2008) and colleagues examined the association between fruit and vegetable access in the community and change in fruit and vegetable consumption among participants in community-based health promotion programs.

Surveys were used to assess fruit and vegetable consumption and perceived access to fresh fruit and vegetables of intervention participants at baseline and one year later at follow-up (Caldwell et al. 2008). Evaluators assessed grocery store offerings to determine community produce availability by examining price, variety, and freshness (Caldwell et al. 2008). The findings of this study indicated greater perceived access to fruits and vegetables was significantly associated with higher increases in fruit and vegetable consumption from the beginning of the program to the completion (Caldwell et al. 2008). As well, increased availability of produce was found to be associated with a greater increase in fruit and vegetable servings from the start to end of the program (Caldwell et al. 2008). The study found that, while the changes in fruit and vegetable consumption made from the beginning of the study to the end were small, they were statistically significant (Caldwell et al. 2008).

Role of Farmers' Markets in Dietary Intake

According to the United States Department of Agriculture (USDA), a farmers' market is defined as a common area where several farmers gather on a recurring basis to sell a variety of fresh fruits, vegetables, and other farm products directly to consumers (United States Department of Agriculture, n.d.). The number of farmers' markets in the United States has continued to increase since the late 1990s. In 1994, there were approximately 1,755 farmers' markets nationwide (United States Department of Agriculture, n.d.). Twenty years later, in 2014, that number increased to 8,284 (United States Department of Agriculture, n.d.). Many studies have found farmers' market shopping to be beneficial for a variety of reasons (Pitts et al. 2014, McGuirt et al. 2014, Baker et al. 2009, Pitts et al. 2013) and farmers' markets may be one way to provide

greater access to a wide variety of fresh fruits and vegetables which may lead to increased consumption.

Affordability, accessibility, and availability have been identified as key barriers to fruit and vegetable consumption. However, farmers' markets may be one solution to minimize these barriers. A study conducted in diverse southern rural communities examined barriers and facilitators to farmers' market shopping in rural communities, and to examine associations between farmers' market access, awareness, and use with the outcomes of fruit and vegetable consumption and body mass index (BMI) (Pitts et al. 2014). While no associations were found between fruit and vegetable intakes and BMI, fruit and vegetable consumption was found to be associated with farmers' market shopping in the majority of rural populations (Pitts et al. 2014). The researchers concluded that farmers' markets could be a viable method to increase population-level produce consumption in rural areas (Pitts et al. 2014).

In a similar study, price and accessibility were examined as influences on willingness to shop at farmers' markets among a low-income population (McGuirt et al. 2014). The results of the study indicated that participants were willing to shop at the farmers' market when the farmers' market was closer to where they lived (McGuirt et al. 2014). The percentage of women willing to shop at the farmers' market increased when greater price savings were offered (McGuirt et al. 2014). In scenarios presented to participants, the farmers' market was identified as being 5, 10, or 15 minutes closer or further to their residential address. Findings indicated rural residents were slightly more willing than urban residents to shop at farmers' markets when it was closer to their homes (McGuirt et al. 2014). These findings confirm previous research findings indicating

farmers' markets in rural communities are a promising location for interventions to promote fruit and vegetable consumption.

Fruit and vegetable consumption, along with shopping patterns, has also been examined with respect to farmers' market access relative to other food shopping outlets. In a study examining the associations between objectively measured access to food venues (farmers' markets and supermarkets), frequency of shopping at venues, and health indicators (fruit and vegetable consumption, body mass index, and blood pressure) among low-income women of reproductive age, Pitts (2013) and colleagues hypothesized that better access to supermarkets and farmers' markets would be associated with more frequent shopping and more favorable health indicators (Pitts et al. 2013). They found a greater percentage of those who shopped at a farmers' market ate five or more fruits and vegetables daily, compared with those who did not shop at farmers' markets (Pitts et al. 2013). This study is consistent with the hypothesis that improved access to and shopping at farmers' markets is associated with improved dietary behaviors (Pitts et al. 2013).

Farmers' markets may also improve access to fruits and vegetables in areas considered food deserts. Larsen (2009) and colleagues examined the impact the farmers' market had on the price and availability of healthy food in an underserved urban neighborhood. A two-stage field survey was administered to determine the price of a healthy food basket, a tool that measures the price and availability of nutritious food, in supermarkets across the city and in an area without a supermarket, the food desert (Larsen et al. 2009). The study found that, in 2005, shoppers in the food dessert paid an average of \$54.42 more than residents who bought food at a supermarket (Larsen et al. 2009). In 2008, this number had decreased to \$11.69 (Larsen et al. 2009). The researchers

concluded that the farmers' market had a major impact on the overall price of groceries in the food desert (Larsen et al. 2009). The farmers' market also improved access to healthy food items, such as broccoli and celery, and provided residents with a significantly better variety of food items (Larsen et al. 2009).

Farmers' Markets and the Food Environment

Research has found higher intakes of fruits and vegetables aid in the prevention of numerous chronic diseases. A study conducted by Jilcott (2011) and colleagues found a connection between farmers' markets and the prevention of obesity, which may be seen as an additional reason for their need in rural communities. Using the United States Department of Agriculture Economic Research Service Food Environment Atlas, data were collected related to county-level obesity prevalence in relation to farmers' markets, grocery stores/supermarkets and supercenters per 1,000 capita (Jilcott et al 2011). The study reported a statistically significant inverse relationship between per capita farmers' markets and percent obesity in non-metro counties (Jilcott et al. 2011). As well, more farmers' markets, grocery stores/supermarkets, and supercenters per capita were associated with lower obesity prevalence overall (Jilcott et al 2011). It can be inferred from this study that access to a farmers' market may reduce the prevalence of obesity because more fruits and vegetables are available. Farmers' markets may encourage patrons to purchase more fruits and vegetables, which may lead to a greater consumption, and a reduced risk of chronic disease.

While the benefits of farmers' markets have been examined in several studies, disparities have also been observed in regards to the availability of farmers' markets. In a study conducted in North Carolina, county-level associations between zoning to support

farmers' markets, availability of farmers' markets, rural/urban designation, percent African American residents, and percent of residents living below poverty among 33 North Carolina counties were observed (Pitts et al. 2015). Individual-level associations between zoning to support farmers' markets, farmers' market shopping, self-reported fruit and vegetable consumption and BMI were also examined among a random sample of residents in three urban and three rural counties (Pitts et al. 2015). Researchers hypothesized that counties with more supportive zoning ordinances would be more urban, have a lower percentage of African American residents, and a lower proportion of residents living below poverty (Pitts et al. 2015). It was also hypothesized that more supportive zoning would be associated with more farmers' market shopping, greater produce consumption, and lower BMI (Pitts et al. 2015). Six counties in North Carolina were selected and random-digit-dial surveys were administered in regards to farmers' market shopping for the individual-level analyses (Pitts et al. 2015). For the county-level analyses, 33 counties were selected and coded zoning ordinances and were given healthy outlet zoning scores (Pitts et al. 2015). Counties were categorized as rural or urban using Urban Influence Codes. Results indicated healthier food zoning present in areas with less poverty (Pitts et al. 2015). The study also found a statistically significant association between fruit and vegetable intakes and shopping at a farmers' market, such that more fruit and vegetable consumption was associated with shopping at farmers' markets (Pitts et al. 2015). When the healthy outlet zoning score increased, there was a strong positive association found between self-reported fruit and vegetable intake and farmers' market shopping (Pitts et al. 2015). Similar to other studies, the association between healthy outlet zoning scores and farmers' market shopping and fruit and vegetable intakes were

lower in rural areas compared to urban counties (Pitts et al. 2015). The researchers deduced that healthier food zoning is associated with healthier dietary behaviors and concluded that, while this study was one of the first of its kind, changes to zoning related to the food environment may help improve healthy food access and reduce health disparities (Pitts et al. 2015).

Farmers' markets may not only create a conducive environment for reducing the risk of chronic diseases and increasing the access to healthy foods, they may also be a resource for local economies and community growth. One study found that the social aspect of farmers' markets may be key to improving consumption of fresh fruits and vegetables in communities where health and nutrition are not necessarily a priority because community connectedness may draw customers (Buman et al. 2014). Farmers' markets are a component of the local food system that may provide a link to improved public, as well as economic, health (Sitaker et al. 2014). In their study of entrepreneurial food systems and the impacts on rural economies and health, Sitaker (2014) and colleagues examined farmers' markets and three other entrepreneurial food systems to determine if they enable producers to make a living, improve local economies, provide local residents with greater access to affordable, healthy food, and contribute to greater consumption of healthy food among local residents. Through this iterative analysis, the researchers found evidence that farmers' markets can be an effective way to increase farm income, help farmers make a living, and support better wages for workers (Sitaker et al. 2014). Evidence was also found indicating that farmers' markets have a positive impact on individual communities and the larger economy through customer reports indicating social benefits and support for local farmers as key reasons for shopping at

their local markets (Sitaker et al. 2014). Incentive programs utilized at farmers' markets were also examined as a potential beneficial strategy contributing to greater intake of fruits and vegetables. The results of this study support further research in the area of local food systems and their benefits, economically, healthfully, and otherwise.

Attitudes toward fruit and vegetable consumption and farmers' market usage have also been evaluated. In a study targeting low-income individuals, Leone (2012) and colleagues assessed barriers and facilitators to eating fruits and vegetables and purchasing fruits and vegetables from local farmers' markets and identified potential individual and environmental influences on these behaviors. This study addressed behaviors, barriers, and facilitators to fruit and vegetable consumption and farmers' market usage, as well as potential strategies for increasing fruit and vegetable consumption and preferred sources of health information (Leone et al.2012). Findings indicated the most common barrier to eating fruits and vegetables was cost and respondents reported they would eat more fruits and vegetables if they cost less (Leone et al.2012). Access to affordable locally grown fruits and vegetables and preparation ideas were also reported facilitators of fruit and vegetable consumption (Leone et al.2012). In regards to farmers' market shopping, the most common barriers reported were not being able to use government assistance program benefits and not knowing about the farmers' market in their area (Leone et al.2012). In response to farmers' market shopping, being able to use governmental assistance program benefits was identified as the most common facilitator (Leone et al.2012). The researchers concluded that the results from this study could aid in the development of a social marketing campaign to promote the purchase of fruits and vegetables at local farmers' markets among low-income consumers (Leone et al.2012).

Marketing of Fruits and Vegetables

Social marketing has been defined as a technique used to analyze, plan, execute, and evaluate programs to influence the behavior of target audiences in order to improve their personal welfare or that of society (Andreasen et al. 2002). Marketing, specifically social marketing, may be a beneficial tool to use at farmers' markets to promote the increased consumption of fruits and vegetables. Social marketing has been successfully used to create positive changes across a variety of settings and populations, and for many healthy eating goals (Gordon et al. 2006). Several campaigns have been implemented at farmers' markets in communities nationwide to examine fruit and vegetable consumption and their influence on shopping behaviors (Blitstein et al. 2012, Freedman et al. 2011).

Consumption of fruits and vegetables can be influenced by the food environment in which customers shop. In a study investigating the perceptions of the food shopping environment and the impact it may have on fruit and vegetable intake, Blitstein (2012) and colleagues examined the relationship between residents' perceptions of their food shopping environment and dietary intake of fruits and vegetables. The researchers hypothesized that those who reported higher levels of satisfaction with the place where they typically bought fresh fruits and vegetables would report a greater consumption of fruits and vegetables (Blitstein et al. 2012). A social marketing campaign, the 5-4-3-2-1 Go! Campaign, was evaluated. Campaign messages promoted the benefits of a healthy diet rich in fruits and vegetables and the use of community resources that support an active lifestyle (Blitstein et al. 2012). Sociodemographic characteristics, daily fruit and vegetable consumption, the fresh fruit and vegetable shopping environment, the cost of fruits and vegetables, and food shopping habits were measured (Blitstein et al. 2012).

Findings indicated respondents who reported higher levels of satisfaction were more likely to eat three or more servings of fruits and vegetables daily and that those shopping at a local co-op or farmers' market, rather than a supermarket, were nearly three times more likely to report eating three or more servings of fruits and vegetables daily (Blitstein et al. 2012). The results of this study support the hypothesis that perceived satisfaction with the food shopping environment is associated with fruit and vegetable consumption (Blitstein et al. 2012).

A similar campaign was implemented at farmers' markets to improve access to healthy foods in low-income, minority, urban communities. This campaign, the Veggie Project, used mixed methods to examine customer utilization of farmers' markets, the association between the financial voucher program and shopping patterns, and attitudes toward the intervention (Freedman et al. 2011). The campaign aimed to address availability and affordability barriers to accessing fruits and vegetables and to increase youth involvement in the prevention of obesity (Freedman et al. 2011). There were three components to the intervention: onsite farmers' markets, an incentive voucher, and a Youth Leader Board encouraging youth involvement (Freedman et al. 2011). A unique element of this study is that it included both adult and youth participants. The study found that both adults and youth made fruit and vegetable purchases at the farmers' markets and receipts revealed that a wide variety of fruits and vegetables were purchased by farmers' market customers (Freedman et al. 2011). Those with incentive vouchers accounted for 66% of the total produce purchases at the markets (Freedman et al. 2011). Qualitative interviews showed that respondents perceived the Veggie Project to be a learning opportunity for the children and their families as well as an opportunity for increasing

exposure and access to fresh foods (Freedman et al. 2011). The interviews also revealed other benefits of the program including that it provided community members with opportunities to provide healthy food for their families, exposed participants to varieties of produce which influenced eating patterns and behaviors, and increased information about healthy eating and cooking (Freedman et al. 2011). The journals collected from youth participants found similar results indicating positive dietary impacts amongst participants. This study exemplifies the benefits of a social marketing campaign and the impact it may have on increasing access to fruits and vegetables.

Other studies have also examined how shopper experiences may benefit from social marketing strategies. A qualitative study conducted by Buman (2014) and colleagues examined how the use of innovative technology captured real-time perceptions that enhanced or detracted from shoppers' experiences at farmers' markets. Consumer-intercept surveys were conducted as shoppers entered the market and participants provided consent before being given instruction on the tool to be used during their shopping experience (Buman et al. 2014). The Discovery Tool was used by shoppers to take pictures and to record their thoughts about their shopping experiences (Buman et al. 2014). After analyzing the photos and voice recordings, researchers found that shoppers placed importance on freshness and abundance as key features of the farmers' market environment (Buman et al. 2014). Shoppers also found product presentation and social interactions to be important, indicating intervention or social marketing strategies for promoting broader or more frequent market participation could be beneficial (Buman et al. 2014). As Buman (2014) notes, these insights regarding product presentation may be useful in encouraging consumers to purchase healthy foods at the markets. Other

findings contributing to the good of farmers' markets include that shoppers were attracted by the social interactions with other customers and vendors, as well as the exchange of food preparation and recipe tips (Buman et al. 2014). The results of this study support the need for marketing at farmers' markets as a potential way to increase the purchase of fruits and vegetables.

Social marketing has also been used in other settings to promote greater fruit and vegetable intake. One study used social marketing strategies in a school-based nutrition education program to determine if a social marketing campaign directed at parents would increase the effectiveness of the program among a low income population (Blitstein et al. 2016). This campaign was added to the school-based nutrition education program titled BASICS, and the social marketing campaign included billboards and posters, television ads, and radio ads (Blitstein et al. 2016). Data was collected using a mail and telephone survey approach and parents/caregivers were surveyed at baseline and follow-up (Blitstein et al. 2016). The results of this study found a statistically significant increase in mean consumption of fruit, but no statistically significant differences were found in mean vegetable consumption or the use of low-fat/fat-free milk for the BASICS treatment group when compared to the comparison group (Blitstein et al. 2016). There was a reported statistically significant increase in mean fruit consumption and mean vegetable consumption in the BASICS Plus treatment group, compared with those in the comparison group (Blitstein et al. 2016). The results of this study indicate the positive effects of a social marketing campaign on fruit and vegetable intake.

A similar study was conducted by Shive (2006) and colleagues examining the effects of a social marketing campaign on fruit intake among college students. The

purpose of this study was to evaluate the effectiveness of a social marketing campaign to improve knowledge and attitudes and to increase fruit consumption among community college students (Shive et al. 2006). Researchers hypothesized that the intervention campus would demonstrate an increase in fruit intake compared with the control campus (Shive et al. 2006). The Energize Your Life! social marketing campaign was created and included a brochure, poster, and table tents, which were distributed on the intervention campus for two months (Shive et al. 2006). Findings indicated students had positive attitudes toward fruits and a significant increase in fruit intake was observed following the intervention (Shive et al. 2006). These results indicate that, while only implemented for a short amount of time, the social marketing campaign produced desired results (Shive et al. 2006). Researchers concluded that social marketing campaigns may be an effective tool to increase awareness of students as a first step toward increased fruit intake to promote health (Shive et al. 2006). The results of this study could be helpful in reaching other populations to promote increased fruit and vegetable consumption.

Summary

Studies have shown that consuming a greater amount of fruits and vegetables is associated with a reduced risk of chronic disease; however, in order to consume greater amounts of fruits and vegetables, people must have access and be able to purchase them. Farmers' markets are a venue offering a wide variety of fruits and vegetables to many communities and greater intakes of fruits and vegetables have been observed in those who choose to purchase fruits and vegetables from markets. Fruit and vegetable intakes have also been found to be greater when social marketing campaigns are used. Studies have confirmed the relationship between farmers' markets and fruit and vegetable

purchases and consumption, as well as the relationship between social marketing campaigns and fruit and vegetable consumption, yet a gap exists in the research examining the relationship between social marketing campaigns at farmers' markets being used to increase fruit and vegetable purchases. More research is needed to further explore this relationship, and that is the focus for the present study.

Chapter Three: Methodology

All procedures were approved by the University of Kentucky (UK) Institutional Review Board (IRB).

Study Design

This study used a cross-sectional survey design to measure the impact of a social marketing campaign on consumer fruit and vegetable shopping behaviors at rural farmers' markets in Kentucky during summer of 2015 and 2016. The social marketing campaign, Plate It Up Kentucky Proud (PIUKP), is a partnership project between the UK Cooperative Extension Service, the Kentucky Department of Agriculture, and the UK Department of Dietetics and Human Nutrition. The project utilizes undergraduate students to develop and test new recipes using local and seasonal fruits and vegetables. After recipes are tested, Cooperative Extension Agents provide recipe cards, food samples, and food demonstrations in their communities as a way to encourage fruit and vegetable consumption among residents.

Participants

Study participants were adolescents and adults, aged 12-91, who were residents of Kentucky. Farmers' market patrons from six rural Kentucky counties, Clinton, Elliott, Letcher, Lewis, Logan, and Martin counties, were recruited to participate in this study in the summer of 2015 (year one – five counties) and the summer of 2016 (year two – six counties). These six counties were eligible based on funding from the Centers for Disease Control and Prevention Obesity Prevention Program. Cooperative Extension Agents in these six counties all agreed to conduct a social marketing campaign as a way to improve food purchasing decisions among residents. The counties have 40% or higher obesity

rates among adults, are rural geographically, and are comprised of primarily white or Caucasian residents (approximately 98%). A convenience sample was used for this study and included participants from each farmers' market. A total of 112 participants were included in year one and 139 participants were included in year two.

Measurements

An IRB approved customer intercept survey was used for this study. The survey contained demographic questions, including preferred language, gender, age, car ownership, education level, SNAP or food stamp recipient status, race, and income. Study participants were asked to reflect on their eating habits over the past year, including fruit and vegetable intakes, and barriers as to why they do not consume fruits and vegetables as much. The survey was developed to collect data about the effectiveness of the social marketing campaign within rural Kentucky counties. The survey questions were previously tested for test-re-test reliability among farmers' market patrons in rural towns (Pitts et al. 2014). The survey was reviewed among UK Cooperative Extension Agents to confirm appropriate wording for residents in these counties. One graduate student distributed and collected the surveys among all farmers' market patrons that were willing to partake in the study during year one and another graduate student distributed and collected the surveys during year two. A total of 112 surveys were collected in year one and 139 surveys were collected from all six counties during a two-month period in year two.

Procedures

One graduate student traveled to the farmers' markets, one located in each county, on either a weekday or weekend day in July or August in year one and year two. Three of the counties were visited twice in year two. On average, 2.5 hours were spent at each market on each day. Market times varied as well. One market was visited from 8 am-10 am, two were visited from 9 am-12 pm, one was from 10 am-12 pm, and two were from 12 pm-2 pm. Several days of the week were chosen to aid in capturing a variety of shoppers at a variety of times. There were anywhere from 2 to 15 vendors at the various farmers' markets. The PIUKP project was used at each farmers' market during each visit in partnership with UK Cooperative Extension. The social marketing campaign consisted of displays with the PIUKP banner and recipe samples with recipe cards. Recipe samples were prepared by UK Cooperative Extension Agents from the county and included Cucumber, Corn and Black Bean Salsa, Broccoli and Grape Pasta Salad, Sweet and Savory Cucumber Salad, Watermelon Tomato Salad, Stuffed Zucchini Boats, Cantaloupe Bread, Broccoli and Cheese Potatoes, and Tomato Bruschetta. Survey participation was voluntary and surveys were self-administered unless it was necessary for the graduate student to read the survey to the participant. Patrons were asked if they would like to try the sample and were then asked to complete the survey regardless of if they tried the recipe sample or not. Each shopper was given a tote bag and gel-pack as incentives for sampling the recipe and completing the survey. In year two, a \$5 gas card was given to SNAP participants who completed the survey and lived greater than 9 miles away from the farmers' market to test the strategy of reducing travel cost as a potential barrier.

Analysis

Data were imported using *SPSS Statistics version 23* to perform statistical analysis. For all statistical analyses, alpha was set at $p < 0.05$. The statistical analysis used descriptive statistics, including frequencies and means, to characterize the survey responses. Demographics, fruit and vegetable intakes, and social marketing campaign exposure were examined as quantitative variables. Chi-square tests were used to examine the association between exposure to a social marketing campaign and fruit and vegetable shopping behaviors post-marketing. Three variables examining consumption of whole fruit, green salad, and other vegetables, were recoded to minimize skewedness. Associations of changes in eating habits of these three variables as a result of the social marketing campaign were examined by chi-square tests.

Chapter Four: Results

Among residents in these counties, 112 participants completed the survey in year one, and 139 participants completed the survey in year two. Demographic data are presented in Table 4.1. In year one, the mean age of participants was 49 years. Most participants were white (97%), female (77%), and owned or leased a car (87%). Of the 112 participants, the majority had obtained at least a high school education, as 24% had completed high school or obtained their GED, 25% had completed some college, and 34% were college graduates. Most participants reported an annual income less than \$20,000 (28%), though 24% had an annual income between \$21,000 and \$39,000. In year one, 16% reported receiving SNAP benefits or food stamps.

In year two, participant characteristics were similar. The mean age of participants was 51 years. Most participants were white (96%), female (88%), and owned or leased a car (85%). Of the 139 participants, 25% had completed high school or obtained their GED, 23% had completed some college, and 24% were college graduates. The majority of participants reported an annual income less than \$20,000 (44%) and 30% reported receiving SNAP benefits or food stamps.

Table 4.1. Descriptive Statistics of Association Between Exposure to Plate It Up Kentucky Proud Social Marketing Campaign and Farmers' Market Purchases Among Rural Residents, Kentucky, 2015-2016

Characteristic	Year One (n=112)	Year Two (n=139)
Preferred Language (English)	100%	100%
Female	77%	88%
Mean age in years	49	51
Own Car	87%	85%
Highest grade completed		
6-8	5%	10%
9-12	11%	18%
High School Grad or GED	24%	25%
Some College	25%	23%
College Graduate	34%	24%
SNAP Recipient	16%	30%
White	97%	96%
Income		
<\$20,000	28%	44%
\$21,000-\$39,000	24%	21%
\$40,000-\$59,000	20%	19%
\$60,000-\$79,000	21%	10%
\$80,000-\$99,000	5%	4%
>\$100,000	3%	2%
Consumption of whole fruit once a day or more	33%	31%
Consumption of green salad once a week or less	38%	40%
Consumption of other vegetables 2-3 times a week	34%	37%
Does having recipe cards available at the market influence your buying of fruits and vegetables while at the market? - Yes	28%	55%
Did the recipe sample available contribute to your buying the ingredients for the recipe you sampled? - Yes	36%	54%
In the past several weeks, did you hear about the Plate It Up Kentucky Proud program?- Yes	69%	50%
If you took a food sample from the Plate It Up Kentucky Proud Program, did that sample make you want to prepare the food item at home?- Yes	19%	74%

Table 4.1 also shows the descriptive statistics for fruit and vegetable intakes. In year one, 33% of participants reported consuming whole fruit once a day or more, 38% reported consuming green salad once a week or less, and 34% reported consuming other vegetables 2-3 times a week. In year two, 31% of participants reporting consumption of whole fruit once a day or more, 40% reported consuming green salad once a week or less, and 37% reported consuming other vegetables 2-3 times a week.

As Table 4.1 shows, nearly one-third (28%) of participants agreed that having recipe cards available at the market influenced their buying of fruits and vegetables at the market and 36% agreed that having the recipe sample available contributed to their buying the ingredients for the recipe in year one. Also in year one, over half of participants (69%) agreed they had heard about the PIUKP program in the past several weeks, though only 19% of those who took the PIUKP sample agreed that it made them want to prepare the sample at home. In year two, 55% of participants agreed that having recipe cards available at the market influenced their buying of fruits and vegetables at the market and 54% agreed that having the recipe sample available contributed to their buying the ingredients for the recipe. Half (50%) of the participants in year two agreed they had heard about the PIUKP program in the past several weeks and 74% agreed that taking the PIUKP sample made them want to prepare the food item at home.

Table 4.2 shows changes in shopping behaviors related to the social marketing campaign, PIUKP, from year one to year two. Having recipe cards available at the market was significantly associated with influencing the buying of fruits and vegetables while at the market ($p < 0.001$) and having recipe samples available was significantly associated with being a contributing factor for the buying of ingredients for the recipe ($p < 0.001$).

Taking the PIUKP food sample was significantly associated with a willingness to prepare the food item at home ($p < 0.001$), however, hearing about the PIUKP program had no effect on shopping behaviors ($p = 0.932$).

Table 4.2. Chi-Square Analysis of Change in Shopping Behaviors Related to Plate It Up Kentucky Proud Social Marketing Campaign

Variable	P-value
Does having recipe cards available at the market influence your buying of fruits and vegetables while at the market?	$p < 0.001$
Did the recipe sample available contribute to your buying the ingredients for the recipe you sampled?	$p < 0.001$
In the past several weeks, did you hear about the Plate It Up Kentucky Proud program?	$p = 0.932$
If you took a food sample from the Plate It Up Kentucky Proud Program, did that food sample make you want to prepare the food item at home?	$p < 0.001$

Significance Level: $\alpha = 0.05$

The change in food consumption behavior observed with the social marketing campaign can be seen in Table 4.3. Hearing about PIUKP was associated with significant intakes of green salad ($p < 0.001$) and other vegetables ($p = 0.010$), but had no effect on

whole fruit consumption ($p=0.25$). Similarly, taking the PIUKP sample was associated with significant intakes of green salad ($p<0.001$) and other vegetables ($p=0.010$), but had no effect on whole fruit intakes ($p=0.25$). The change between year one and year two green salad intake ($p<0.001$) and other vegetable intake ($p=0.010$) were both found to be significant, while whole fruit intakes were not effected ($p=0.25$).

Table 4.3. Eating Habits in Relation to Plate It Up Kentucky Proud Social Marketing Campaign

Intakes	Change from Year One to Year Two	Awareness of PIUKP	PIUKP Recipe Sample
Whole Fruit	$p<0.25$	$p<0.25$	$p<0.25$
Green Salad	$p<0.000$	$p<0.000$	$p<0.000$
Other Vegetables	$p<0.010$	$p<0.010$	$p<0.010$

Significance Level: $\alpha=0.05$

Chapter Five: Discussion

The purpose of this study was to assess the influence of a social marketing campaign on fruit and vegetable shopping behaviors of farmers' market patrons from six rural Kentucky counties over a two-year period. The results of this study indicate that shopping behaviors may have been influenced by the PIUKP social marketing campaign. Exposure to the PIUKP social marketing campaign via recipe cards and sampling the PIUKP recipe were both significantly associated with influencing the purchase of fruits and vegetables at the farmers' market.

Research demonstrates that use of incentives may improve the shopping behaviors of farmers' markets patrons (Freedman et al. 2014, Lindsay et al. 2013, Savoie-Roskos et al. 2016, Young et al. 2013). Gas cards were used as an incentive in year two of this study for SNAP recipients, who accounted for 30% of the study population, as a way to minimize the barrier of travel costs to utilizing the farmers' market. Research suggests that incentives utilized at farmers' markets in low-income communities not only reduce financial barriers, but may lead to increases in SNAP purchases at the market, which can lead to increased fruit and vegetable consumption (Young et al. 2013, Baronberg et al. 2013). One study found greater increases in SNAP sales at Philadelphia farmers' markets in a low-income area following the implementation of an incentive program and also found those who took the incentive were significantly more likely to report eating more fruits and vegetables (Young et al. 2013). In another study, Baronberg (2013) and colleagues found that farmers' markets in low-income areas that offered an incentive to SNAP recipients averaged higher sales than markets not offering an incentive. While it is unknown if offering of an incentive influenced the present study results in this capacity,

favorable results were observed. Freedman (2014) and colleagues supported utilizing incentives as a strategy to increase farmers' market use among food assistance program recipients as one way to promote healthier purchases. The results of their study indicated overall food assistance usage at the rural farmers' markets more than doubled after the introduction of an incentive (Freedman et al. 2014). In another study, Savoie-Roskos (2016) and colleagues identified farmers' market incentive programs as an innovative strategy to improve fruit and vegetable intake among low-income individuals. Their study findings indicated increased intakes of certain vegetables among study participants after receiving farmers' market incentives (Savoie-Roskos et al. 2016). The present study found green salad intakes and other vegetable intakes to be significantly influenced by the PIUKP social marketing campaign in year two when the gas card incentive was offered. This suggests that, while small, the \$5 gas card incentive may have influenced the purchasing habits of SNAP recipients and vegetable intakes in our study population, indicating the need for additional investigation.

Other research has suggested that providing exposure interventions, such as recipe samples and cooking demonstrations, may also increase purchasing decisions of farmers' market patrons (Bowling et al. 2016). Recipe samples were utilized as an exposure intervention in the present study to promote the consumption of fruits and vegetables in the rural setting. Bowling (2016) and colleagues aimed to explore the importance of exposure interventions and financial incentives as drivers of summer programming participation. The results of their study revealed both exposure interventions and financial incentives as equal drivers of program participation (Bowling et al. 2016). In the present study, an association was found between having recipe samples available at the farmers'

market and the decision to buy the ingredients for the recipe in the summer season. The PIUKP food sample was also associated with a willingness to prepare the food item at home, supporting earlier research on the social marketing strategy. Stephenson (2013) and colleagues examined the impact of PIUKP on the purchase and preparation of locally grown fruits and vegetables among farmers' market patrons. Two weeks following the recipe sampling experience, 36% of those surveyed had prepared the recipe at home (Stephenson et al. 2013). These results lend support as evidence for the current study outcomes, as 74% of participants were willing to prepare the PIUKP recipe at home. This suggests patrons' likelihood of purchasing items at the farmers' market and preparing the food item at home may have increased following survey participation. The findings of the present study are consistent with previous research and highlight how offering a variety of strategies can be effective at improving shopping behaviors among rural residents.

While not causal, the significant association found between taking the PIUKP food sample and a willingness to prepare the item at home may influence purchasing decisions. It may also increase exposure to and intakes of fresh fruits and vegetables among rural residents. This association is supported by research finding positive linkages between farmers' markets, social marketing campaigns, and fruit and vegetable intakes (Freedman et al. 2011, Blitstein et al. 2012, Webber et al. 2013). Freedman (2011) and colleagues implemented a social marketing campaign at farmers' markets in low-income, urban communities as a strategy to improve access to healthy foods. Study participants purchased a wide variety of fruits and vegetables, and identified the social marketing campaign as a learning opportunity for children and families, and also an opportunity to increase access to fresh foods (Freedman et al. 2011). Similarly, Blitstein (2012) and

colleagues examined how fruit and vegetable consumption was influenced by the food environment through a social marketing campaign promoting the benefits of a healthy diet and the use of community resources. The study found respondents who shopped at a local co-op or farmers' market were nearly three times more likely to report eating more servings of fruits and vegetables daily (Blitstein et al. 2012). Likewise, the PIUKP social marketing campaign was previously implemented at farmers' markets in Kentucky to explore the campaign's influence on fruit and vegetable intakes. Webber (2013) and colleagues sought to characterize farmers' market patrons' nutrition knowledge and dietary habits by utilizing PIUKP food samples and recipe cards. Results from the survey indicated farmers' market patrons have a strong interest in the nutrition information for foods and recipes at the market, and farmers' market patrons consume higher than average amounts of fruits and vegetables (Webber et al. 2013). The results of these studies are favorable for promoting change in dietary behaviors related to fruit and vegetable consumption and illustrate the benefits of utilizing social marketing strategies at farmers' markets as one way to increase exposure to fresh fruit and vegetables. While the present study was implemented in a rural setting, as opposed to an urban setting, the results indicate the positive influences of the PIUKP campaign at farmers' markets and support the need for further research in this setting.

Limitations

There are several limitations to this study. First, a cross-sectional study design was used, establishing a lack of causality. Second, survey responses were self-reported and social desirability bias may have influenced participant responses. Third, the sample was not representative of all rural populations, as participants were primarily white and

female in both years one and two. As well, the small sample size limits generalizability to all rural residents in Kentucky and nationwide. Finally, increased awareness of the PIUKP program may have been observed because of grocery store interventions that were taking place in the counties at the same time. These limitations should be considered before interpreting and applying these results.

Implications

This study assessed the influence of a social marketing campaign, PIUKP, on fruit and vegetable purchasing habits at farmers' markets in rural Kentucky counties with obesity rates greater than 40%. Dietary changes, like increased consumption of fruits and vegetables, can aid in the prevention and management of many chronic disease conditions, including obesity, and can lead to increased quality of life. Farmers' markets may be influential venue for increasing fresh fruit and vegetable consumption among community residents. This study provides evidence for the importance of utilizing social marketing strategies at farmers' markets in rural communities as a way to promote increased fruit and vegetable consumption and better overall health.

Recommendations for Future Studies

Future research should expand upon the results found in this study. Different forms of financial incentives and their influence on farmers' market purchases, as well as fruit and vegetable consumption habits, should be examined to assess the benefits of utilizing these alongside social marketing campaigns. Also, data on actual point-of-purchase and fruit and vegetable consumption may be insightful. Future studies are needed to determine farmers' market use facilitators and barriers in this setting. It would

also be of interest to conduct a similar study for a longer period of time to further investigate the impact of a social marketing campaign on fruit and vegetable consumption and lifestyle changes that may improve overall health.

REFERENCES

- Andreasen, A. R. (2002). Marketing Social Marketing in the Social Change Marketplace. *Journal of Public Policy & Marketing*, 21(1), 3-13.
- Barile, John P., William W. Thompson, Matthew M. Zack, Gloria L. Krahn, Willi Horner-Johnson, and Sonya E. Bowen. "Multiple Chronic Medical Conditions and Health-Related Quality of Life in Older Adults, 2004–2006." *Preventing Chronic Disease Prev. Chronic Dis.* 10 (2013): n. pag. Web.
- Baronberg, S., Dunn, L., Nonas, C., Dannefer, R., & Sacks, R. (2013). The Impact of New York City's Health Bucks Program on Electronic Benefit Transfer Spending at Farmers Markets, 2006–2009. *Preventing Chronic Disease*, 10.
- Blitstein, J. L., Snider, J., & Evans, W. D. (2012). Perceptions of the food shopping environment are associated with greater consumption of fruits and vegetables. *Public Health Nutr. Public Health Nutrition*, 15(06), 1124-1129.
- Blitstein, J. L., Cates, S. C., Hersey, J., Montgomery, D., Shelley, M., Hradek, C., . . . Singh, A. (2016). Adding a Social Marketing Campaign to a School-Based Nutrition Education Program Improves Children's Dietary Intake: A Quasi-Experimental Study. *Journal of the Academy of Nutrition and Dietetics*.
- Bodor, J., Ulmer, V., Futrell Dunaway, L., Farley, T., & Rose, D. (2010). The Rationale Behind Small Food Store Interventions In Low-Income Urban Neighborhoods: Insights From New Orleans. *Journal of Nutrition*, 140(6), 1185-1188
- Bowling, A. B., Moretti, M., Ringelheim, K., Tran, A., & Davison, K. (2016). Healthy Foods, Healthy Families: combining incentives and exposure interventions at urban farmers' markets to improve nutrition among recipients of US federal food assistance. *Health Promotion Perspectives*, 6(1), 10-16.
- Buman, M. P., Bertmann, F., Hekler, E. B., Winter, S. J., Sheats, J. L., King, A. C., & Wharton, C. M. (2014). A qualitative study of shopper experiences at an urban farmers' market using the Stanford Healthy Neighborhood Discovery Tool. *Public Health Nutr. Public Health Nutrition*, 18(06), 994-1000.
- Caldwell, E. M., Kobayashi, M. M., Dubow, W., & Wytinck, S. (2008). Perceived access to fruits and vegetables associated with increased consumption. *Public Health Nutr. Public Health Nutrition*, 12(10), 1743.

CDC. (2013, August 02). Framing the Issue- Social Ecological Model. Retrieved February 12, 2017, from <https://www.cdc.gov/nccdphp/dnpao/state-local-programs/health-equity/framing-the-issue.html>

CDC. (2015, October 27). Social Ecological Model. Retrieved February 12, 2017, from <https://www.cdc.gov/cancer/crccp/sem.htm>

"Chronic Disease Prevention and Health Promotion." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, 2016. Web. 21 February 2016.

Dean, W. R., & Sharkey, J. R. (2011). Rural and Urban Differences in the Associations between Characteristics of the Community Food Environment and Fruit and Vegetable Intake. *Journal of Nutrition Education and Behavior*, 43(6), 426-433.

Dietary Guidelines for Americans 2015–2020 8th Edition. (n.d.). Retrieved March 10, 2016, from <http://health.gov/dietaryguidelines/2015/guidelines/>

Freedman, D. A., Bell, B. A., & Collins, L. V. (2011). The Veggie Project: A Case Study of a Multi-component Farmers' Market Intervention. *The Journal of Primary Prevention J Primary Prevent*, 32(3-4), 213-224.

Freedman D.A., Mattison-Faye A., Alia K., Guest M.A., Hebert J.R.. (2014). Comparing farmers' market revenue trends before and after the implementation of a monetary incentive for recipients of food assistance. *Preventing chronic disease*. 11:E87.

Ford, E. S., Giles, W. H., & Dietz, W. H. (2002). Prevalence of the Metabolic Syndrome Among US Adults: Findings From the Third National Health and Nutrition Examination Survey. *Obstetrical & Gynecological Survey*, 57(9), 576-577.

Gordon, R., Mcdermott, L., Stead, M., & Angus, K. (2006). The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health*, 120(12), 1133-1139.

Grimm, K. A., Foltz, J. L., Blanck, H. M., & Scanlon, K. S. (2012). Household Income Disparities in Fruit and Vegetable Consumption by State and Territory: Results of the 2009 Behavioral Risk Factor Surveillance System. *Journal of the Academy of Nutrition and Dietetics*, 112(12), 2014-2021.

Hartley, L., Igbinedion, E., Thorogood, M., Clarke, A., Stranges, S., Hooper, L., & Rees, K. (2012). Increased consumption of fruit and vegetables for the primary prevention of cardiovascular diseases. *Protocols Cochrane Database of Systematic Reviews*.

Jilcott, S. B., Keyserling, T., Crawford, T., McGuirt, J. T., & Ammerman, A. S. (2011). Examining Associations among Obesity and Per Capita Farmers' Markets, Grocery Stores/Supermarkets, and Supercenters in US Counties. *Journal of the American Dietetic Association*, 111(4), 567-572.

Larsen, K., & Gilliland, J. (2009). A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food. *Health & Place*, 15(4), 1158-1162.

Leone, L. A., Beth, D., Ickes, S. B., Macguire, K., Nelson, E., Smith, R. A., . . . Ammerman, A. S. (2012). Attitudes Toward Fruit and Vegetable Consumption and Farmers' Market Usage Among Low-Income North Carolinians. *Journal of Hunger & Environmental Nutrition*, 7(1), 64-76.

Lindsay S., Lambert J., Penn T., Hedges S., Ortwine K., Mei A., et al. (2013). Monetary matched incentives to encourage the purchase of fresh fruits and vegetables at farmers markets in underserved communities. *Preventing chronic disease*. 10:E188.

Lutfiyya, M., Chang, L. F., & Lipsky, M. S. (2012). A cross-sectional study of US rural adults' consumption of fruits and vegetables: Do they consume at least five servings daily? *BMC Public Health*, 12(1), 280.

McCormack, L. A., Laska, M. N., Larson, N. I., & Story, M. (2010). Review of the Nutritional Implications of Farmers' Markets and Community Gardens: A Call for Evaluation and Research Efforts. *Journal of the American Dietetic Association*, 110(3), 399-408.

McGuirt, J. T., Pitts, S. B., Ward, R., Crawford, T. W., Keyserling, T. C., & Ammerman, A. S. (2014). Examining the Influence of Price and Accessibility on Willingness to Shop at Farmers' Markets Among Low-income Eastern North Carolina Women. *Journal of Nutrition Education and Behavior*, 46(1), 26-33.

Moore, L. V., Roux, A. V., Nettleton, J. A., & Jacobs, D. R. (2008). Associations of the Local Food Environment with Diet Quality--A Comparison of Assessments based on Surveys and Geographic Information Systems: The Multi-Ethnic Study of Atherosclerosis. *American Journal of Epidemiology*, 167(8), 917-924.

Oyebode, O., Gordon-Dseagu, V., Walker, A., & Mindell, J. S. (2014). Fruit and vegetable consumption and all-cause, cancer and CVD mortality: Analysis of Health Survey for England data. *Journal of Epidemiology & Community Health*, 68(9), 856-862.

Pitts, S. B., Wu, Q., Mcguirt, J. T., Crawford, T. W., Keyserling, T. C., & Ammerman, A. S. (2013). Associations between access to farmers' markets and supermarkets, shopping patterns, fruit and vegetable consumption and health indicators among women of reproductive age in eastern North Carolina, USA. *Public Health Nutr. Public Health Nutrition*, 16(11), 1944-1952.

Pitts, S. B., Gustafson, A., Wu, Q., Mayo, M., Ward, R. K., Mcguirt, J. T., . . . Ammerman, A. S. (2014). Farmers' market use is associated with fruit and vegetable consumption in diverse southern rural communities. *Nutrition Journal Nutr J*, 13(1), 1.

Pitts, S. B., Acheson, M. L., Ward, R. K., Wu, Q., Mcguirt, J. T., Bullock, S. L., . . . Ammerman, A. S. (2015). Disparities in healthy food zoning, farmers' market availability, and fruit and vegetable consumption among North Carolina residents. *Arch Public Health Archives of Public Health*, 73(1).

Savoie-Roskos, M., Durward, C., Jeweks, M., & Leblanc, H. (2016). Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers' Market Incentive Program Participants. *Journal of Nutrition Education and Behavior*, 48(1). doi:10.1016/j.jneb.2015.10.003

Shive, S. E., & Morris, M. N. (2006). Evaluation of the Energize Your Life! Social Marketing Campaign Pilot Study to Increase Fruit Intake Among Community College Students. *Journal of American College Health*, 55(1), 33-40.

Sitaker, M., Kolodinsky, J., Pitts, S. B., & Seguin, R. A. (2014). Do entrepreneurial food systems innovations impact rural economies and health? Evidence and gaps. *American Journal of Entrepreneurship*, 7(2), 3-16.

Stephenson T, Stephenson L, Mayes L, Webber K. Plate It Up! Kentucky Proud: a case study of a local food system fruit and vegetable point-of-purchase social marketing campaign. *Cases in Public Health Communication & Marketing*. 2013;7:60-76.

Story, M., Kaphingst, K. M., Robinson-O'brien, R., & Glanz, K. (2008). Creating Healthy Food and Eating Environments: Policy and Environmental Approaches. *Annual Review of Public Health*, 29(1), 253-272.

Turati, F., Rossi, M., Pelucchi, C., Levi, F., & Vecchia, C. L. (2015). Fruit and vegetables and cancer risk: A review of southern European studies. *British Journal of Nutrition Br J Nutr*, 113(S2).

USDA ERS - Chart: Number of U.S. farmers' markets continues to rise. (n.d.). Retrieved March 8, 2016, from <http://ers.usda.gov/data-products/chart-gallery/detail.aspx?chartId=48561>

Webber, K. H., Stephenson, T. J., Mayes, L., & Stephenson, L. (2013). Nutrition Knowledge and Dietary Habits of Farmers Market Patrons. *World Applied Sciences Journal* , 23(2), 267-271.

Young, C. R., Aquilante, J. L., Solomon, S., Colby, L., Kawinzi, M. A., Uy, N., & Mallya, G. (2013). Improving Fruit and Vegetable Consumption Among Low-Income Customers at Farmers Markets: Philly Food Bucks, Philadelphia, Pennsylvania, 2011. *Preventing Chronic Disease*, 10. doi:10.5888/pcd10.120356

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